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Government
Publications

Environmental assessment for municipal projects

The application of The Environmental Assessment Act, since 1976 limited to major provincial undertakings, has been extended to include significant municipal projects of more than \$2 million value. Environment Minister Harry C. Parrott announced in the Ontario Legislature.

The new regulations also list projects for which an environmental assessment will be required regardless of their value, as for example waste disposal sites. Municipal projects under way are not included in the requirement for assessment if the project has been approved by council resolution, if land has been acquired

specifically for the project or if a notice of application has been filed under The Expropriation Act. The regulations also provide for a one-year phase-in period so that municipalities can adapt provincial "class environmental assessment" procedures to minor transportation projects, minor transmission lines, transformer stations and com-

munication towers. Under the "class assessment" certain common projects will follow general procedures for their "class" to simplify the application of the Act. To ensure that municipalities are well prepared with the new advanced planning procedure, staff from the ministry's environmental approvals branch is preparing an education program for municipal officials.

paring legislation that will assure municipalities that provincial concerns about their projects will be dealt with by one single comprehensive tribunal representing both the Ontario Municipal Board and the Environmental Assessment Board.

"Our experience has shown that The Environmental Assessment Act is working well on provincial projects," Dr. Parrott said. "In the last year, 57 undertakings have been submitted for assessment and so far 11 have gone through this advanced planning procedure. Only one project has been referred to the Assessment Board for formal hearings, and these hearings are under way."

ENVIRONMENT
ONTARIO

LEGACY

Vol. 9 No. 2

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New acid rain monitors cover Ontario

By the end of August, Ontario will be covered province-wide by two networks of acid rain monitoring stations, Ontario Environment Minister Harry C. Parrott has announced.

The monitoring stations which are being set up at 45 locations will measure deposition and identify sources of acid rain and other pollutants related to long-range air transport.

"These monitoring stations will play an important role in Environment Ontario's ongoing research to determine the quantity, acidic concentrations and impact of acid rain and snow falling in all parts of the province. The program will also identify more clearly the relative contributions to this pollution from numerous continental sources," Dr. Parrott explained.

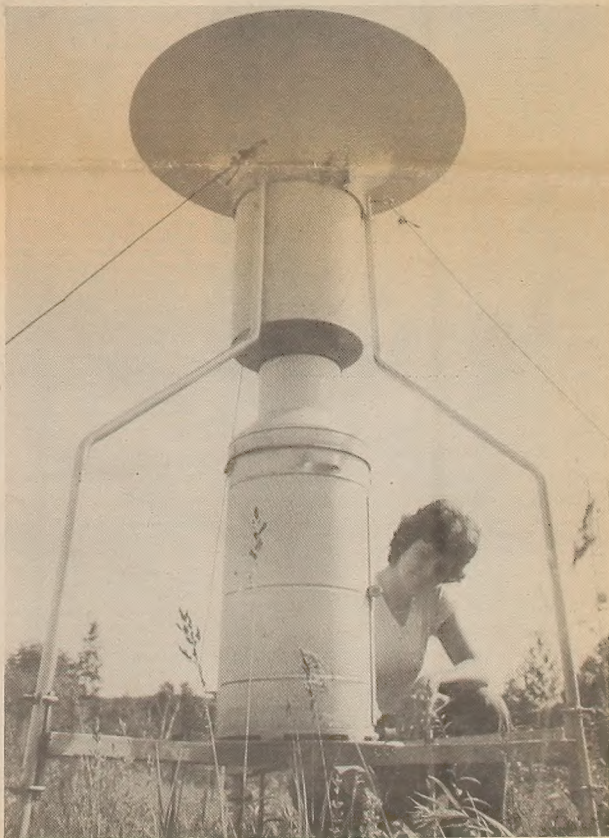
The monitoring network known as "Atmospheric Deposition

Studies," is one of a number of scientific investigations under way under the Acid Precipitation in Ontario Study (APIOS). Through it, Ontario is compiling vital scientific information required to better link and assess the source and receptor relationship of acid rain to enable it to establish effective pollution abatement measures.

In the current 1980-81 fiscal year, the Ontario Government proposes to spend \$5 million on scientific studies and abatement strategies concerned with acid rain and long-range transport of air pollutants. Environment Ontario will spend over \$3 million of this amount on meteorological, aquatic and terrestrial studies and experimental projects intended to lead to abatement remedies. The remainder will be spent on programs involving other ministries, which include socio-economic impact studies, to make optimum use of abatement programs and determine priorities, as well as tactics, manpower and money required.

The two monitoring networks are complementary but will yield different information. One is designed as a "true event" network to yield daily samples. The other is a "cumulative" network sampling precipitation and particulate matter for monthly collection. Both are designed to collect "wet" deposition (precipitation such as rain and snow) and "dry" deposition (particulate matter, or dust, and sometimes gaseous substances). All samples will be analyzed at Environment Ontario's Toronto laboratories using special equipment required to detect low levels of airborne contaminants.

The "event" network is being set up in the areas of London, Dorset and Kingston. Each centre has five collection or monitoring sites clustered within a radius of 50 to 100 kilometres. The Dorset location was chosen because of the major acid rain studies in progress there already. The London and Kingston areas will provide information of local acidic deposition from major northeastern continental sources.



(photo: Robert Koci)

This spectacular device is neither the 77th trombone in the band, nor a crafty device used to eavesdrop on political speeches held on other planets. It is one of the instruments that can catch and measure the amount of precipitation and will soon be a common sight at the 45 locations of the Atmospheric Deposition Studies network. Barbara Locke, scientist with Environment Ontario's water resources branch, is removing the sample holder at one of the units installed at the ministry's Dorset station.

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LEG

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It's all one world...

Earth needs one third forest cover



Environment Minister Harry C. Parrott and the "man of the trees", Dr. Richard St. Barbe Baker plant a tree in Queen's Park, Toronto, to mark "World Environment Day 1980".

Florida has acid rain, too

The acidity of rainfall in Florida has increased markedly in the past 25 years, reports P.L. Brezonik of the Department of Environmental Engineering of the University of Florida.

The average sulfate and nitrate concentrations have increased by factors of 1.6 and 4.5 respectively over the period. Annual average pH values for precipitation below 4.7 are now registered over the northern three-quarters of the state.

Sweden goes lead-free

Sweden may be the first European country to adopt lead-free gasoline on public health grounds. A government committee has firmly recommended the measure because it believes that children may risk mental impairment from leaded car exhaust fumes.

The committee wants Swedish cars to run lead free by 1982, and by 1985 to run on "gasohol", a fuel in which the alcohol content replaces lead, an anti-knock agent. During the transition period, a special tax is to be levied on leaded gasoline.

It may not be a nuclear holocaust which eliminates mankind from the earth. The end may come from the destruction of the world's main oxygen manufacturer — our trees.

That was part of the message Dr. Richard St. Barbe Baker, world renowned forester, conservationist and founder of Men of the Trees, delivered in Toronto to members of the Ministries of the Environment and of Natural Resources about his work and tour of Canada, the United States and Mexico.

Of the earth's 30 billion acres of land, 9 billion acres are already desert. The minimum tree coverage we need is one-third of the total land surface, he said.

Dr. Baker, invited by Environment Minister Harry C. Parrott to address the group at Queen's Park,

said the one-third ratio must be maintained to allow oxygen-carbon dioxide cycles in the atmosphere to work.

The slender, sinewy, 91-year-old New Zealander has dedicated his life to the conservation of forests. In 1922 he recruited some 9,000 African tribesmen — Men of the Trees — to plant millions of trees to check the invasion of the Sahara onto their land.

Dr. Baker, working with U.S. President Franklin Roosevelt, was also instrumental in halting the destruction of California's giant redwoods. His greatest concern now is a campaign in South America to save the Amazon forests, which produce half the world's oxygen.

By the end of the century tropical rain forests will be found only

in remote parts of the Amazon basin and in some areas of equatorial Africa, reports a committee of the US National Research Council headed by P.H. Raven of the Missouri Botanical Garden. These remnants will also disappear in 40 to 50 years.

The forests are being destroyed at a faster rate than expected by commercial timber harvesters, forest farmers, cattle raisers and fuel wood gatherers.

Of the four to five million animal species in the world, three million are found in the tropical forests, and no more than one sixth of these have been inventoried. Disappearance of the forest will not only deprive the world of one of its important CO₂ sinks, but also of an important gene pool.

Russia sets no example

Pollution control is a global affair and will only be fully successful when all nations combine their efforts. The weak link in the chain encircling the industrialized northern hemisphere seems to be the Soviet Union, according to a recently published book "The Destruction of Nature in the Soviet Union."

The manuscript of the book is said to have been smuggled out of the Soviet Union, and the author's identity is hidden behind the pen name Boris Komarov. But western experts have little doubt about the authenticity of the book's contents.

The author claims that one tenth of the habitable parts of the Soviet Union has been laid waste by logging, mining and industry and is already subject to erosion, desertification and poisoning of land and water. Siberia may be turned into a frozen wasteland within 20 years.

special brigades to clear soot...

equipment, pollute the waterways.

The author believes that the Soviet system stressing growth and productivity is basically opposed to the protection of the environ-

ment. In fact, the more grandiose plans to harness nature contradict natural laws, the higher they are regarded by the Soviet bureaucracy.

Something was fishy...

Before writing the caption for the photo published on page 1 of the May-June issue of LEGACY, I consulted three confessed fishermen in our office — and all agreed: the larger object in the photo was an attractive member of the species homo sapiens, the smaller object a smallmouth bass.

After publication of the issue, however, a fisherman's storm broke loose. By phone and by letter, readers expressed doubts about the smaller creature.

Some called it a whitefish, some "a very ugly fish" but not a bass, others named it ling. But most opted for gizzard shad.

So did Dr. Ed. Crossman, ichthyologist with the Royal Ontario Museum. (Ichthyologists are scientists who know everything — or nearly everything — about fish.)

Sorry — I stand corrected. And thankful for every one of your comments.

Robert Koci



Ministry of the Environment
Ontario

Hon. Harry C. Parrott, D.D.S., Minister
Graham W.S. Scott, Q.C., Deputy Minister

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Editor Robert Koci

Director of Information Services R.J. Frewin

Four new treatment plants on stream

by Ken Ballantyne

Today communal water services are provided to 98 per cent of our urban population and communal sewage systems are serving 94 per cent of the population of Ontario. These percentages moved up a little higher in the week of June 2, when Environment Ontario officially opened four new plants.

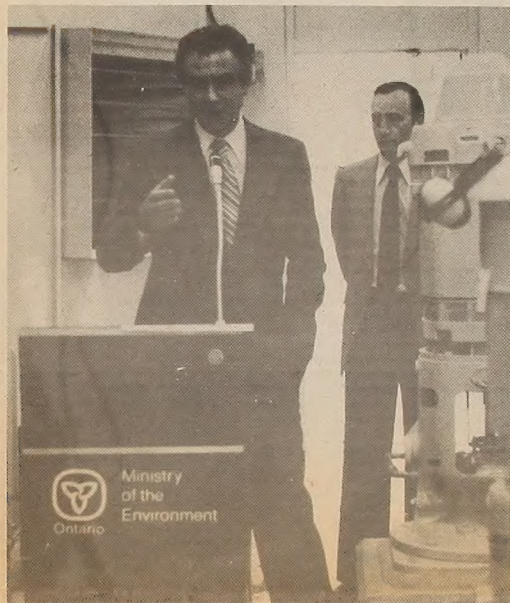
Premier William Davis, Lorne Henderson, minister of agriculture and food, and area representatives, participated in the official ribbon cutting ceremonies for the \$6.8 million Petrolia Water Pollution Control Plant on June 4. This new system produces a high quality effluent which will improve the quality of water in the receiving stream, Bear Creek.

Glasses were raised in toasts that officially opened the \$6.4 million Rose Hill Water Treatment Facility on June 2 and the Mount Brydges Water Distribution System on June 6. The glasses did not contain champagne, but were filled with water from the new plants. The

opening toasts were made by Environment Minister Harry C. Parrott, and representatives of the municipalities.

The village of Wyoming, just four miles north of Petrolia, officially opened its Water Pollution Control System on June 6. Dr. Parrott and municipal officials cut the ribbon for this \$3.7 million plant which is also designed to improve the quality of water in Bear Creek.

These systems are part of Environment Ontario's program to improve health standards across the province as well as to improve the quality of water which flows in our lakes and streams.



(photo: Joan Leishman)

Environment Minister Harry C. Parrott and southwestern region director D.A. McTavish at the opening of the Township of Caradoc water distribution system.

Ontario Premier W.G. Davis and Lorne C. Henderson, Minister of Agriculture and Food, at the opening of the Petrolia Water Pollution Control Plant.

(photo: Ken Ballantyne)

Costs and capacities:

Petrolia: (20 km southeast of Sarnia)

More than 12 kilometres (8 miles) of service connectors were used to join over 22 km (14 miles) of sanitary sewers in this water pollution control plant which cost \$6.8 million and serves the 4,400 residents of the Town of Petrolia. The extended aeration plant with a tertiary filter has a capacity of 3000 cubic metres (3000m³ or .7 million gallons) per day but can handle 9550m³ (2.1 million gallons) during peak periods.

Wyoming: (6 km north of Petrolia)

The Village of Wyoming plant is also an extended aeration plant with a tertiary filter, and produces a high quality effluent. The \$3.7 million plant has a capacity of 1100m³ (.25 million gallons) per day but can handle 3300m³ (.75 million gallons) during heavy periods from the 1,554 residents.

Caradoc: (20 km west of London)

The opening of the Township of Caradoc Water Distribution System marked the end of water shortages and excessive iron contents in the water for the 5,600 residents. In this \$2.4 million system, chlorine is the only chemical added to the township's water. From the reservoir almost 20,000 metres of watermain carry water through the distribution system.

Rose Hill: (near Fort Erie)

The installation of this system allowed the old inefficient facilities to be phased out. The capacity of the water treatment plant, at a cost of \$6.4 million, increased from 6 million gallons per day to 10 million gallons per day for the 23,200 residents. The old plant provided only limited water treatment and occasionally produced water with a high turbidity level.



Pitch In Day 1980



Pick up, pitch in, work, work, work, together to conquer big loads of litter.

(photo: Hans Eljensck)

"Clubs, volunteers and children did

More than 50,000 Ontarians joined forces on Saturday, June 7, to pick an estimated 200 tons of garbage out of the landscape for Pitch In Day 1980.

Pitch In Day, initiated by the Ontario Federation of Anglers and Hunters with the assistance of the Ministry of the Environment, brought out volunteer crews across the province to clean up streambanks, roadsides, vacant lots, and other areas infested by litter.

"The clubs, volunteers and children did a great job," said Environment Minister Harry Parrott. "A project like this is always difficult to get off the ground. I'm glad the OFAH got such a good response."

will clear up a few communication and organizational problems we had this year."

Areas with the most enthusiastic response owe their success to dedicated, hard-working community co-ordinators. These men and women were the backbone of the individual projects and achieved amazing results.

"Summertime brings a flow of campers, cyclists and hikers through Ontario. Finding clean, well kept sites should encourage these tourists to keep them this way," Ogston said.

"This year's success should inspire others to come out and make next year's Pitch In Day even bigger and better!"

People care in Sudbury

by Patti Murby

Ominous clouds and an occasional sprinkle of rain didn't dampen spirits of the eager groups who set out early Saturday, June 7, for various litter-strewn sites in the Sudbury area.

Their mission: to pitch in, clean up and show Ontario that some people do care!

*from morning
to late afternoon*

Federation clubs from such areas as Val Caron, Copper Cliff, Creighton, Lively, Coniston and Sudbury began their clean ups around 9:00 Saturday morning and worked into the late afternoon. In some cases, the clean ups extended into the next day.

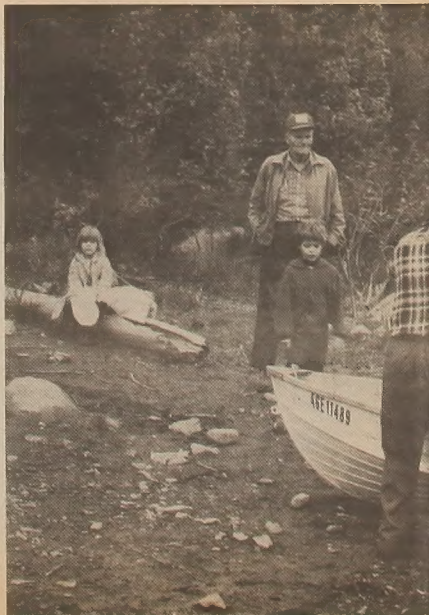
With help from energetic residents, school children, clubs,

scouts, brownies and guides, the hunters and anglers cleaned up garbage throughout the Sudbury area. Stream banks, landings, fields and roadsides were some of the sites where lazy residents and forgetful campers dumped garbage, leaving anything from old toilets to pop cans.

Trucks donated by individual club members, the City of Sudbury, the Ministry of Transportation and Communications, Inco and others were filled to the top with rusting wrecks, bags of garbage and kids!

Most of the groups broke around noon to meet in a large field for hot dogs, beans and pop. After lunch it was back to the sites to finish the difficult and dirty jobs they set out to do.

At the end of the day there were a lot of tired bodies and dirty faces but a great sense of satisfaction for everyone who went out to pitch in.



Little ships cleaned up big loads of garbage from streambanks.

terrific first effort

Doug Ogston, president of the OFAH, was delighted with the willingness and excitement the campaign generated. "It was a terrific first effort by all volunteers. They should feel great about their part in helping to keep Ontario beautiful. It's encouraging to know that so many people really do care about our environment — even the toddlers helped."

Ogston said that in future programs the federation will try to involve more schools, service clubs and a larger number of communities. "Ontario is a big place. We hope that time and experience

40 boats on Detroit River

by Joan Leishman

Black rolling clouds, thrashing rain, and tornado warnings forced an abrupt halt to clean up operations in Windsor during the All Ontario Pitch In Day.

The campaign whirled into full swing in the city of Windsor under the direction of John Lock, a member of the Windsor Sportsmen's Club.

Despite the weather and first-time organizational problems nearly 2,500 residents joined forces and collected 30 1/2 tons of litter.

"It took three months of intense organization," Lock said, "but seeing so many people working together to make our city cleaner has made it all worthwhile. In spite of the rain I think everybody had a great time."

by land and by water

Prior to Pitch In Day children from 105 public and separate schools gathered garbage along their way to and from school. This group which numbered close to 20,000 had sacked 15 tons of debris before the official program began.

On June 7, 40 boats owned by members of the Outdoor World

Bassmasters launched into the Detroit River to clean up around Peach Island and along 20 miles of shoreline from the Island to Amherstburg.

CBs in contact

At the same time land crews were quickly mulling through the city, bagging discarded refuse and challenging each other to see who could pick up the most.

Members of Big Brothers, Big Sisters, Pathfinders, the William-Bar Club, Brownies, Girl Guides, Scouts, Cubs, Beavers, the Windsor Boys Club, a variety of CB clubs and the Sportsmen's Club all pitched in.

The operations were monitored by REACT, a CB group which set up its base at the Sportsmen's Club. Boaters and groups equipped with CB's used them to call in for refreshments and collection trucks, to make progress reports, and to keep in touch in case of injuries.

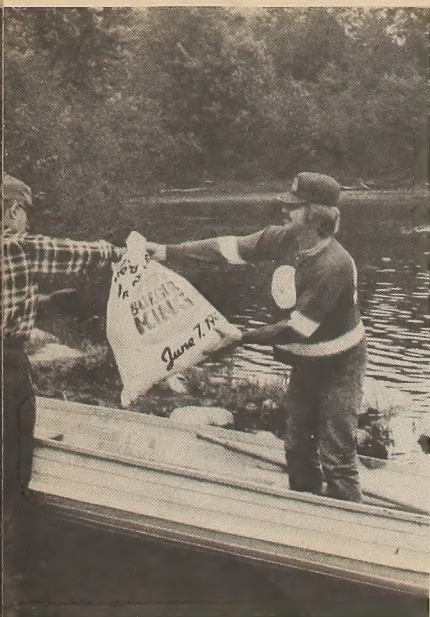
Back at home basic soggy jackets were peeled off, food and refreshments served, and all told their tales of the day's events. They had made the campaign a tremendous success and perhaps a few were pondering how to make next year's even better.



Even the small fry helped to keep Ontario beautiful.

(photo: Hans Eijssenck)

a great job"



(photo: Joan Leishman)

Midland youngsters will remember

by Robert Koci

It's 9 a.m. and the large clubhouse of the Georgian Bay Hunters and Anglers Association in Midland is fast becoming a beehive of activity.

Carloads of parents and youngsters are coming in, asking for an assignment to collection areas, and for plastic bags.

Orten Crawford, president of the association, and Lloyd Wilson, co-ordinator for Pitch In Day, are handing out both, together with canvass gloves. The garbage bags and 12 dozen work gloves have been donated for the occasion by a local firm.

Members of the association arrive with pick-up trucks, and are soon on their way to the areas where volunteers are already busy picking up litter—along highways and concession roads, in the area around the local drive-in, in municipal parks.

Lloyd finishes giving directions to reporters from local media. Then he invites me to an inspection tour.

The working groups are easy to find. All Lloyd has to do is to fol-

low full garbage bags lined up every 100 metres or so on the soft shoulder of the road. Pick-up trucks pass by, load up and transport the garbage to the local landfill site.

"This is our first effort of this type," explains Lloyd while driving. "I am surprised to see how much garbage is strewn all over the landscape by careless people. There is no way we can pick it all up today."

"But I feel," he adds when we catch up with a couple of teenagers busily filling bags "that there is more to it than just cleaning up. There are some 100 youngsters out today and each of them will think twice next time he is tempted to throw something away."

Along a local highway a group of air cadets have their work well organized. Behind the shopping centre on Highway 27 a large group of brownies and girl guides in colorful windbreakers, shawls and caps drag full garbage bags through the high grass to the side of the road.

"It's a bit late in the season," complains Lloyd. "Next year Pitch In Day should be called sooner, before the high grass hides

the refuse, and before poison ivy spreads. And before mosquitoes start making life hard on the collectors."

We return to the clubhouse and find Orten and several members of the association tending a big fire in an outdoor fireplace to get water boiling in a large kettle. They drop 500 or so hot dogs into it.

In the kitchen volunteers are cutting hot dog buns, dicing onions and filling bowls with all the trimmings.

One of the members works on a soft drink dispenser. He gets the machinery working just as the first hungry boy scouts start to come in.

"Wash your hands first, before you touch anything!" Orten warns. A good idea. After all, the kids have been handling all kinds of refuse for hours.

While they are getting ready, they tell all about it—about nearly new bicycles they found, mountains of beer bottles, whole bedsteads, and . . . and . . .

Then they line up for the goodies. The large hall fills with life. "We hardly made a dent in it," a youngster reports. "We'll have to do it again . . . It's really fun, you know . . ."



Environment Ontario's fleet flagship, "Guardian I", leaves Toronto Harbour for a day of work on Lake Ontario.



Mate Richard Savage operates the hydraulic boom lifting the zooplankton sampler.

The lines are cast off. With its twin diesels purring gently at slow speed, "Guardian I," the flagship of Environment Ontario's fleet, leaves its berth in Toronto Harbour.

Captain John Barnes reaches for the mike of the marine radio telephone.

"Toronto Harbour Communications, Toronto Harbour Communications, Toronto Harbour Communications — Guardian One."

"Guardian One — come in on twelve," a voice answers. Captain Barnes switches the channel.

"We are leaving dock 213 and will be going out the Eastern Gap," he says.

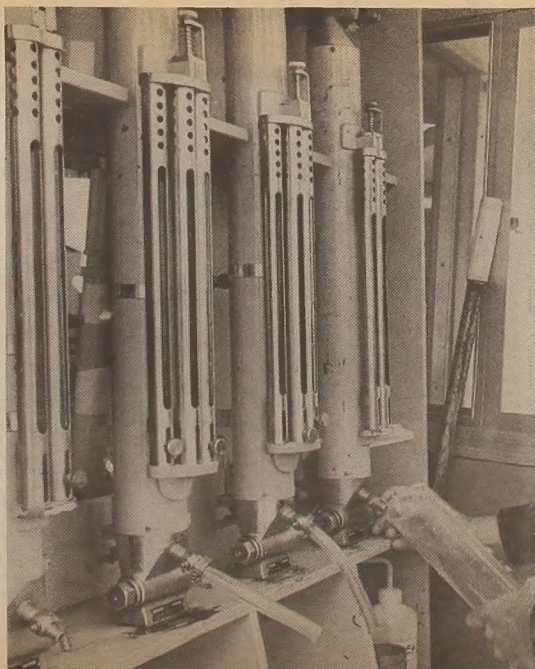
"Roger."

"Guardian I" moves slowly through the harbour. The sky is lightly overcast — just right to make the fascinating Toronto skyline stand out.

But neither Captain Barnes nor mate Richard Savage, nor the three men in the lab right behind the wheelhouse of the ship, have time to admire it.

Mate Richard is coiling the lines on deck, and the men in the lab are busy. Patrick Laffey, field leader, is filling out forms. Technicians Rick Donaldson and Bob Raven are unpacking boxes containing instruments and glassware of various sizes and shapes.

After completing its part in the spring sampling program on the Great Lakes — and after getting a



Technician Bob Raven draws a water sample from one of the Nansen samplers.

Guardian I on guard for Great Lakes

Story by Robert Koci,
photos by Tessa Buchan

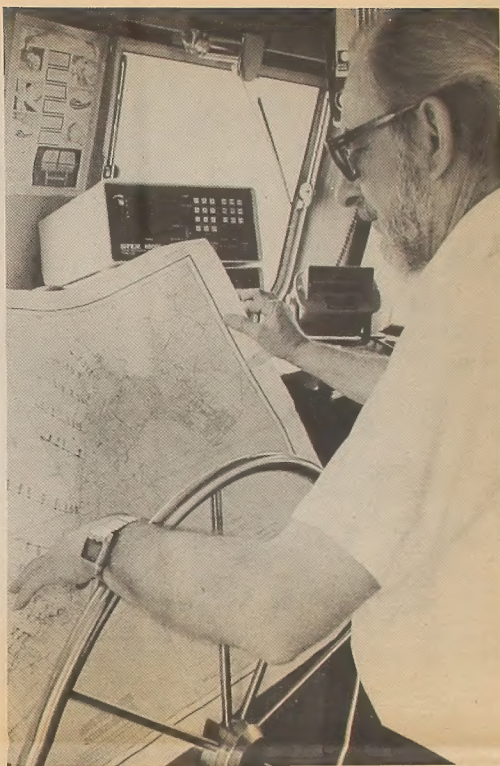
prop straightened out in a Port Weller drydock — "Guardian I" is now busy doing weekly transects on Lake Ontario. In this project, water from a series of near-shore locations between Toronto and Port Hope is sampled and tested weekly for the evaluation of up to 10 parameters to determine its quality and any changes that may occur. The parameters include measurement of nutrients, algal biomass, bacteria, dissolved substances such as chlorides and sulphates, dissolved oxygen, turbidity, pesticides and heavy metals. Some of the data can be determined on the spot in the small lab on board ship.

"The water temperature at various depths, its acidity and alkalinity

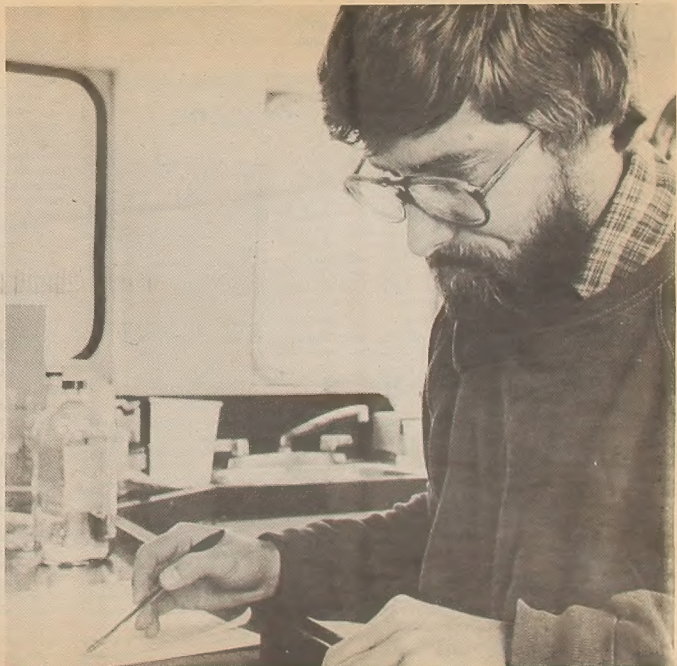
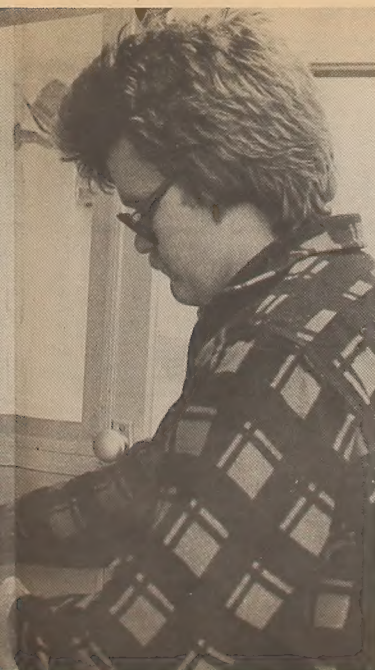
and oxygen content are determined right here," explains Patrick Laffey. He shouts to make himself understood. "Guardian I" is now out of the harbour, has rounded the Leslie Street Spit and is heading east along the coast. Its two diesels of 300 hp each move the ship at 12 knots — and their noise makes conversation difficult.

Not much conversation is needed, though. The men in the lab know their job. While Patrick is still busy with his paperwork, Rick and Rob calibrate the pH-probe, sort out the glassware, check the four Nansen and one Kemmerer water samplers, prepare sampling bottles by labelling them in advance. Mate Richard is preparing

(continued on pg. 8)



Captain John Barnes checks his course to one of the transects against the chart.



Patrick Laffey, Environment Ontario scientist, devotes much of his time on board to paper work.



Karen Higgins Biss from Mississauga and Leslie Little from Whitby are testing their senses at the ministry's Bolton workshop.

(photo: Hans Eijssenk)

75 attend handicapped workshop

Can handicapped children benefit from learning about their environment?

Seventy-five Ontario teachers and Environment Ontario think so.

In May the ministry sponsored its third annual Environmental Studies Workshop for Special Education Teachers at the Bolton Outdoor Education Centre in Bolton. This workshop, devoted entirely to environmental teaching

techniques for the handicapped, is the only one of its kind in Canada.

Resource people from outdoor education centres, universities and institutions for the handicapped instructed participants on how to introduce a variety of environmental subjects, including energy, soil and astronomy, to blind, deaf, physically and mentally handicapped youngsters.

"We feel that environmental

studies provide many benefits for handicapped children," said Murray Cheatham, Environment Ontario's education and public affairs co-ordinator.

"A well-designed program improves a child's achievements in other school subjects. It builds self-confidence, encourages interpersonal relationships and develops leisure skills for all youngsters, but especially those with special needs."

New acid rain monitors

(continued from pg. 1)

This network uses highly sensitive instruments specifically designed to sample particulate and gaseous sulphur and nitrogen compounds for 24-hour periods. The instruments will work automatically for eight days before filters must be replaced.

The daily data generated at these centres, coupled with relevant meteorological data, can aid in the identification of the major continental sources contributing to acidic precipitation in Ontario. The meteorological data will be obtained through a computer link with the Atmospheric Environment Service of Environment Canada.

The "cumulative" network consists of 30 sites, ranging in location from the Windsor area northwest to the Kenora region and northeast to James Bay, down the Ottawa River, south to Alexandria in Glengarry County, and westward to sites scattered throughout south central Ontario.

Each of these monitoring stations will be equipped with automatically operated Sangamo "double bucket" collectors to measure both "wet" and "dry" deposition. Samples will be collected monthly for laboratory analysis. Some 20 of these stations will also be equipped with instrumentation to collect monthly

samples of particulate sulphate, nitrate, ammonium and gaseous SO₂ in their immediate vicinity.

Together, the two monitoring networks will enable scientists to gather information in all regions of the province.

By applying these data to information gleaned from other studies, Environment Ontario expects to be able to extrapolate its current and anticipated scientific findings on lake deterioration rates due to acid rain to widely scattered regions of the entire province.

Stations in southern Ontario are being installed by a consulting firm, Monitex Ltd., and those in northern Ontario by ministry employees.

Guardian I...

(continued from pg. 7)

the hydraulic boom mounted on the afterdeck and used mainly for the lowering and the recovery of various types of samplers, such as the zooplankton sampler, and the Nansen bottles.

As we approach the target area, Richard comes to the wheelhouse. Using landmarks, radar, chart and depthfinder he helps Captain Barnes to place the ship exactly on the transect line—a line drawn on the chart from shore out to the 50 meter depth onto Lake Ontario on which the sampling stations are marked.

"We can place the Guardian within 10 feet of the designated spot," explains Captain Barnes. "In the past years we have used buoys—but with the instruments we now have we can achieve the same precision and save the work of placing and retrieving buoys and of chasing after the markers that drift away or get damaged."

The sampling spots are placed in water depths of 8, 12, 16, 25 and 30 meters. Various samples are taken at various depths within the water column—some at each meter of depth, others at 1.5 meters from the surface, in mid-depth and at 2 m above bottom.

This is a lot of sampling. It is made easier by markings on the various cables used to let probes and samplers down. On the crane a meter indicates the amount of cable out.

half an hour for each sampling

Mate Richard handles the hydraulic boom and the zooplankton trap. Patrick measures water temperature and oxygen content at 1 m increments. Rick and Rob handle the Nansen bottles and the reversing thermometers, draw samples into the various containers, record them on forms and mark them with content and destination for the various sections of the ministry's laboratory.

The afterdeck is the scene of intensive activity.

With idling diesels Captain Barnes watches the drift of his ship and has time for a cup of coffee—there is always a pot of water simmering on the electric stove in the ship's galley in the forward cabin. When the lab crew signals completion of sampling, Captain Barnes takes "Guardian I" to the next spot. He stops the ship 9 nautical miles offshore, in 12 m of water. The afterdeck becomes very active again.

It takes about half an hour to complete all sampling on one station.

In the wheelhouse, Captain Barnes talks about "his" ship. She is 54 feet overall length, with a steel hull shaped like the hull of east coast fishing cutters. The twin diesels can take her at 12 knots speed over a distance of 600 miles—just enough to cross Lake Superior with a bit of fuel to spare—on full tanks holding 1300 gallons of diesel fuel.

The wind—calm in the morning—gets up to 10 knots from the Northwest, and Captain Barnes reports it to the lab crew. The one

foot or so waves don't rock the boat.

At 1 p.m.—nobody takes time off for lunch—"Guardian I" reaches the last station about three miles offshore, in 50 m of water.

"We do only near shore sampling within five miles of the shoreline. The deep waters of the lakes are monitored by crews of Environment Canada's Canada Centre for Inland Waters in Burlington," says Captain Barnes. "But we all work together. 'Guardian I' and the fleet of four small vessels has been assembled by the ministry to meet Ontario's commitment to the Great Lakes Agreement. Sampling locations, sampling frequency and parameter selection are based on previous investigations and extensive inventories of water uses occurring along our Great Lakes shoreline."

steering home by gyrocompass

At about 1 p.m. sampling is completed. The lab crew sorts and packs the samples—some on dry ice, others in the laboratory's refrigerator, checks labels, adds preservative to some samples, fills out forms, and more forms, or uses de-ionized distilled water to wash probes and sampling equipment.

Mate Richard and one of the lab technicians slip into the galley and soon the smell of some stew brewing down below wafts up the companionway to the wheelhouse.

A short time later mate Richard comes up, carrying a tray with round things on it.

"These are bagels with peanut butter and cheese—these with cheese only," he indicates, and leaves the tray in the wheelhouse for the skipper and guests.

The stuff tastes good.

Captain Barnes has the ship back on course for home. With the CN Tower well visible he seems to be heading quite a bit out onto the lake.

"I have to steer 230° by gyrocompass," he explains, "to avoid the Leslie Street headland—it is low and not easily visible from out on the lake. You can see the trees on Toronto Island long before you spot the spit." The wind is up to 15 knots, Northwest, and the "Guardian I" heads at 12 knots nearly into it. Spray flies up from the bow now and then, and the windshield wipers are going.

At 3 p.m., "Guardian I" enters the Eastern Gap again.

Captain Barnes throttles the diesels down to 1100 RPM.

The laboratory crew is busy again, packing used and unused glassware into crates and getting the crates out on the afterdeck for offloading. Captain Barnes makes his last entries into the log book, mate Richard gets the lines ready for docking.

A couple of sailboats take upwind in the harbour, one of them with a reef in the main.

"The wind is up a bit further," says Captain Barnes.

The Toronto skyline looks good. That's the way it must be seen—from aboard a ship. But the crews on board "Guardian I" never seem to find time enough to look at it...

Award winners study Muskoka water quality

Thirteen Haliburton area elementary students spent a day in June studying water quality on Lake St. Nora, as a reward for their creative effort and environmental concern.

The Grade 5 and 6 students designed winning entries in Environment Ontario's school poster competition, held this year in conjunction with the Haliburton County Board of Education, as part of the ministry's local educational program.

"Staff from the Muskoka-Haliburton district office spoke to about 300 students from three local schools, and received 81 projects, all posters and models on a variety of environmental issues," said Colin Macfarlane, director of the ministry's Central Region. "One very effective project was a bottle of blue water labelled 'Acid Rain,' holding a globe in its paper arms. It really got the message across." An Environment Ontario Certificate of Merit was presented to each participant.

The 13 finalists toured the Leslie M. Frost Centre, near Dorset, with lunch provided at the centre. Technical support boats took the group out on the lake, where a Ministry biologist instructed the students in lake testing procedures.

The students learned how to take water samples at various depths, measure dissolved oxygen, and gather zooplankton, the tiny organisms on which fish feed.

"We wanted to give the finalists a chance to do the kinds of tests actually used in our studies," said Macfarlane, "because they seem to be very aware of their environment and its problems. That's the kind of interest we encourage in our school program."



Linda Tashlin and Lisa Williams of Haliburton Senior Elementary School check a sample of St. Nora Lake water.

(photo: Hans Eijnen)

Inco order discussed

About 200 citizens of Sudbury and area attended a public meeting in the council chambers of the Sudbury civic centre to hear the pros and cons of a proposed control order being issued by the Ontario Ministry of the Environment to substantially reduce SO₂ emissions from Inco Limited's nickel smelting complex. Chairman of the meeting was Mayor T. W. Davis of the town of Walden.

Both the company and technical staff from the ministry's Sudbury regional office made pertinent submissions. Inco president and chief executive officer, Walter Curlock, expressed serious concerns that the control order would impose a ceiling on nickel production, would curtail employment, and was not formulated on a scientific basis or evidenced specific environmental benefits. The president also indicated that Inco might appeal the control order, not because the company was in opposition to reducing emissions, but only to have the terms of the order reviewed.

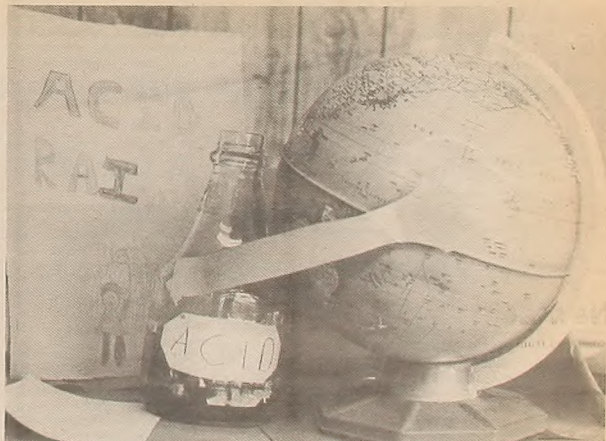
In announcing the proposed control order, Ontario Environment Minister Harry Parrott outlined that the program calls for a freeze on SO₂ emissions to a total maximum average of 2,500 tons per working day when the control order takes effect. Further, there is to be a reduction to 1,950 tons per day by the end of 1982 with the

facilities to achieve this maximum to be in full operation by June 1, 1982. In the long term, Inco will be required to investigate methods to reduce its emissions to the lowest possible levels.

Les Fitz, industrial abatement officer for the ministry's northeast region, presented the brief on the proposed control order on behalf of the ministry. He was introduced by regional director C.E. McIntyre. In general the brief expanded on the requirements of the control order, detailing the specifics and stressing the ultimate reduction in the local and long range environmental effects of the Sudbury Inco operations.

Before the public meeting three information sessions were held in the civic centre. About 45 citizens used the opportunity to review the background material and discuss the ramifications of the control order with representatives of both the ministry and Inco.

Ten individual presentations were made at the public meeting for and against the proposed control order. Supporting the requirement, and in some instances asking for even stricter controls were the United Steel Workers, Sudbury Local 6500; members of the provincial Legislature Marion Bryden and Floyd Laughren; the Sudbury Association for the Environment, the Whitefish Indian Reserve; the



The award winning entry submitted by Duane Pratt and Richard Beers of Archie Stouffer Elementary School in Minden shows very well the global influence of acid rain.

(photo: Hans Eijnen)

Canadian Nature Federation; the Federation of Ontario Naturalists, and two private citizens.

Challenging the order and asserting that it was based on political expediency rather than scientific fact was the Sudbury Chamber of Commerce. The Regional Municipality of Sudbury passed a

resolution which supported the efforts of the ministry to reduce the SO₂-acid rain consequences, but contended that the control order should be established on a scientific basis, not endanger jobs, penalize one community or one industry.

The public meeting lasted for

approximately four hours and was covered by 17 representatives of news media.

Dr. Parrott and staff have since held meetings with the council and residents of the Muskoka and Haliburton Region to review the control programs.

The future of air quality monitoring

Adapted from a paper presented by Dr. R.B. Calton, of Environment Ontario's air resources branch, at the Joint Annual Conference APCA and PCAO in April 1980 in Toronto.

Recent trends in measurements of sulphur dioxide and total suspended particulate matter (TSP) concentrations across the province's air quality network have indicated consistent reductions in these and most other monitored pollutants.

The effects of air pollution upon which traditional air quality approaches have focussed are mainly acute or episodic effects on human breathing. The terms of Ontario's Air Pollution Index (API), which takes into account sulphur dioxide and particulates, reflect this approach. The API has played an important role in the success of the ministry's abatement programs by providing a measure of the results.

As air pollution episodes become less common, the ministry has recognized that subtle, chronic effects may also be important in the overall impact of airborne contaminants. Long-term exposure to low levels of some of the 1,600 or so compounds that have been found in the air may also affect the health of the population.

To determine these effects and to provide an effective all-around control of air quality, much more research is needed, and a number of research projects designed to provide this information are under way in North America.

In Ontario, the following projects funded or directed by Environment Ontario will point the way to the future development of air pollution control:

At the University of Waterloo, Professor Frank Karasek has been

involved since 1970 in the detailed chemical analysis of particulate matter emitted by diesel engines and airborne particulate matter in general. This continuing research is especially valuable in view of the increased use of diesel engines in passenger cars and the possible trend to greater use of coal as an energy source.

The concentration of polycyclic aromatic hydrocarbons on particles is the subject of intensive study by

chemical reactions on filter surface

internationally known Professor Morris Katz of York University. Professor Katz has found that some of these hydrocarbons which are believed to be carcinogenic, concentrate in the fine or respirable fraction of airborne particulate matter.

Environment Ontario-sponsored research at the Ontario Research Foundation indicates that some organic compounds measured in airborne particle samples may be formed by chemical reaction on the surface of sampling filters, and that others may be lost from high-volume filters by evaporation. These findings indicate that the generally used high-volume samplers are not appropriate for the sampling of some airborne particles.

Professor Michael Quilliam of McMaster University has started a search, partly financed by Environment Ontario, for better ways of sampling.

Two studies are funded by The Provincial Lottery Trust Fund. One is a major project undertaken jointly with Health and Welfare Canada by a McMaster team. The subject is the effect of environ-

mental factors on the respiratory health of school children. It involves about 3,000 Hamilton area children between seven and ten.

The study is expected to clarify the amount of pollutants acceptable as air quality criteria and to untangle the complex mixture of pollutants and exposure which determine the total effective dose.

This work is co-ordinated with the World Health Organization's 'Pilot study on the Assessment of Human Exposure to Air Pollutants' which involves six major urban centres, including the Toronto-Hamilton area.

In the field of particle sampling and analysis, Ontario is indebted to the extensive research of the U.S. Environmental Protection Agency. The agency's decision to establish an inhalable particles network in the U.S. will strongly influence similar developments in Ontario. Samplers built to EPA specifications will be evaluated by Environment Ontario.

two-part samplers for contaminants

One of the objectives will be to determine whether the samples collected by this equipment can be analyzed in ministry laboratories.

The air resources branch of the ministry and Environment Canada's air pollution control directorate are evaluating a two-part sampler designed to determine concentrations of selected contaminants in the fine-particle size fraction of particulates. The APCD will be operating samplers in five Canadian cities in addition to an Environment Ontario site in Toronto. Several such commercially available samplers are compared in this project with other commonly used devices.

The detailed study of such fine particles in air will not only be useful for the determination of health effects, but also for the research on the long range transport of air pollutants. To obtain both, health effect and transport information from an air quality monitoring network, sites, samplers and analytical methods will have to be determined carefully.

Since 1975 Environment Ontario has accumulated more experience in the sampling and analysis of PCBs and other organics in air than most other regulatory agencies in the world. For example, the ministry has recently reported the results of an extensive province-wide ambient air survey for PCBs.

One approach tried for organics sampling is the passive dosimeter, currently used in the form of a badge worn by individuals. To determine whether such dosimeters are sensitive enough, Environment Ontario is funding a study by Professor Barry French of the Institute for Aerospace Studies, University of Toronto. The badges have shown some promise. A dense network of such devices could be deployed for routine long-term air quality monitoring of a large

number of organics in cities and near sources of industrial emissions.

Air monitoring in emergencies is relatively new to Environment Ontario. The air resources branch expects that its mobile Trace Atmospheric Gas Analyzer, TAGA 3000, will play a significant role in such situations in the future. The TAGA can respond instantaneously to small quantities of a large number of gases. The deployment of such a single mobile instrument over the large area of Ontario is under intensive study.

The requirements for future air quality data are complex. The accumulated data are not sufficient to resolve the enormous number of components of both particulate contaminants and of contaminants that appear in the form of vapors. The mix of contaminants may differ greatly in various areas, interacting in different ways to produce different effects.

The implications of, for example, subtle behavioral changes possibly brought about by the exposure to certain contaminants may be serious. It cannot be assumed that we have won the battle against air pollution just because we have been relatively successful in controlling the traditional forms of pollution.

Trout health shows lakeshore capacity

All trout fish are sensitive to water quality and the health of lake trout populations is one of the main factors indicating whether the shore of a certain lake may take further development or not.

The 'Report on Water Quality Management of the Lake Trout

Waters of Southeastern Ontario.' Volume II, recently published by the Ministries of the Environment and Natural Resources, identifies the water quality in 52 lakes on this basis and shows which of the lakeshores can be developed further and which are too sensitive for development.

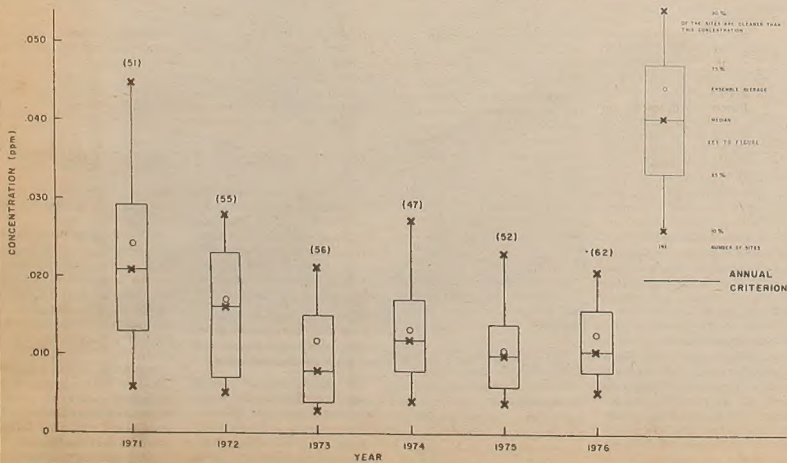
The lakes studied are grouped into three categories according to their sensitivity to development. The groupings will be re-examined within five years for possible changes in the situation.

'The report is based on studies carried out from 1975 to 1978 on lakes in Renfrew, Hastings, Lennox and Addington and Frontenac counties,' R.E. Moore, Environment Ontario southeastern regional director, said.

'These lakes offer some of the best overall water quality for swimming, boating and other recreational sports in Ontario,' Moore said. 'But dissolved oxygen levels in some of them are only marginally suitable for lake trout, and shoreline development could lead to a further oxygen depletion.'

The new report and Volume I of the same report published in 1977, complete an Environment Ontario program started in 1975, to document the water quality of 104 lakes.

Further information and copies of the report can be obtained from the Ministry of the Environment, Southeastern Region, 133 Dalton Street, Kingston, Ontario K7L 4X6.



TREND OF SULPHUR DIOXIDE IN ONTARIO, 1971 TO 1976

Higher acidity causes higher mercury contamination

Yearling fish reveal connection

After a study of one-year-old fish in 14 precambrian lakes, Environment Ontario scientists have concluded that fish living in acidic water show a higher level of mercury contamination than fish living in lakes less affected by acidic precipitation.

Details of the findings are contained in the report "The Effects of Water Quality and Morphometric Parameters on Mercury Uptake by Yearling Yellow Perch," released by Environment Ontario.

Depending on the acidity of the lakes studied, mercury residues in the young fish ranged from 0.02 parts per million (ppm) to 0.197 ppm. These levels of mercury contamination are significantly below fish consumption guideline levels. Normally fish of the size studied are not eaten.

Lakes studied ranged from highly acidic to alkaline with high buffering capacity. Lowest mercury concentrations were found in fish from lakes with high buffering capacity, and in one lake that had been experimentally treated with lime in 1975 and 1976.

Another factor that influenced the mercury uptake of fish was the size of the lake's drainage basin. In lakes of similar acidity higher mercury contaminations were found in fish from lakes with larger drainage basins. In lakes with low acidity and high buffering capacity the sizes of drainage basins did not have any measurable influence on fish mercury concentration.

"The results indicate that acid stress in lakes may be a precondition for the faster uptake of

mercury by fish," Environment Minister Harry C. Parrott said. "To further clarify the effect of lake acidity and mercury contamination of fish on human health, we are continuing research on the relationship between mercury contamination of yearlings and of adult sportfish in acid stressed precambrian lakes."

pin point source of contaminant

The use of yearling fish for the study of water conditions has been developed since 1975 by Environment Ontario's limnology and toxicity section. Young fish travel only short distances and their analysis therefore pinpoints sources of contamination better in space and time than a study on older fish. This investigation can also indicate quickly and reliably changes in contamination and the effect of abatement measures.

Young fish sampling has also been used in mercury investigations in the Wabigoon-English River area; to measure the quality of effluents from sewage treatment plants; to identify contaminant sources in the Great Lakes and for contaminant trend monitoring.

This year Ontario is spending more than \$5 million on research into aspects of acid rain. The study is one stage in the ministry's long-range research program designed to determine the possible effects of acid rain on human health.



Karl Suns of Environment Ontario's water resources branch weighs young fish before testing them for contamination. (photo: Tessa Buchan)

International co-operation key to acid rain solution

Solid evidence that acid rain can be controlled only by intensive international co-operation is presented in three research reports released by Environment Ontario.

The reports are significant in three ways, says Environment Minister Harry C. Parrott.

The results are based on extensive field measurements and meteorological analysis reflecting the best technology and methodology. This information is particularly valuable in light of the preliminary state of computer-simulated projections under development by both federal and provincial scientists.

"They provide a good data base to measure the effects of abatement programs now under way and still to come at Sudbury and other areas containing significant sources."

"When this information is combined with the initiative Ontario is taking in pollution abatement, the urgent need for action in the U.S. becomes increasingly apparent."

With a control order being issued to Inco Ltd., which places an immediate ceiling on sulphur dioxide production and calls for increasingly stiffer cutbacks, Dr.

Parrott said, Ontario has shown it is prepared to act. He said Ontario now has further evidence on which to base a demand for action on an international scale.

Dr. Parrott urged federal authorities to work with the U.S. to get some real control work under way south of the border and counteract the energy-related pressure for more coal-fired generating plants to produce still more acid rain.

The three reports are: **Acidic Precipitation in South-Central Ontario (Muskoka and Haliburton): Analysis of Source Regions Using Air Parcel Trajectories.**

Monitoring of rain and snow from 1976 through 1979 shows that 90 per cent of acid contributions stem from areas to the south and only 10 per cent from the north. Northerly sources account for roughly 9 per cent of the acid, 7 per cent of sulphate and 8 per cent of nitrates as compared to 80 per cent, 75 per cent and 65 per cent respectively from the south and southwest.

Bulk Deposition in the Sudbury and Muskoka/Haliburton Areas of Ontario during the shutdown of Inco Ltd. in Sudbury.

Monitoring of atmospheric fall-out both wet and dry from 1976 through 1979 at sampling stations in the Sudbury area and Muskoka and Haliburton was compared before and during a prolonged shutdown of the Inco complex.

Acid loadings did not show any marked change during the shutdown at the Sudbury monitoring stations or in Muskoka-Haliburton.

Sulphate loadings decreased in the immediate Sudbury area during the shutdown but remained unchanged at a station 40 kilometres away.

The report noted that the Inco Ltd. operations cause a significant deposition of copper and nickel in the Sudbury area.

An Analysis of the Impact of Inco Emissions on Precipitation Quality in the Sudbury Area.

This report dealt with rainfall during August to September 1978 and June to October, 1979.

Tentative conclusions were that the contribution of Inco Ltd. during these months to wet deposition of acidity is from 10 to 20 per cent of the total. When warm fronts bring polluted air masses from the

south, the local source contributes about 10 per cent of acids, sulphur and trace metals excluding copper and nickel. For cold fronts, local sources contribute 20 per cent of the total deposition.

Environmental training courses

The Province of Ontario has been a leader in Canada in environmental pollution abatement and control. To remain in this position, Environment Ontario provides a training program that is available to those involved in the environmental protection field.

These short courses are available not only to ministry staff but also to other Ontario government and non-government organizations.

The annual program of 25 training courses runs 33 weeks from September to June inclusive. It is administered by the ministry's Training and Certification Section. Each course is developed, under the guidance of T&C staff, by a course development committee composed of knowledgeable indi-

viduals from the ministry, municipalities, industry and consulting firms.

In 1979/80 some 50 training sessions were conducted in Toronto. Some workshops and on-site training sessions were organized and conducted by T&C staff in other areas of the province. Approximately 1,500 trainees participated, 60 per cent being from organizations other than MOE.

Information on the September 1980-June 1981 program can be obtained by contacting:

**Registration Secretary
Training & Certification Section
Personnel Services Branch
Ministry of Environment
135 St. Clair Avenue West, 7th.
Toronto, Ontario M4V 1P5
Tel: (416) 965-1027**

The men who kept the water running

by Patti Murby

RED LAKE — The place was deserted, no power or lights, just streets lit by thousands of acres of burning forest a half mile from town.

"It was really eerie, almost as if a U.F.O. had plucked everyone from their homes, leaving only abandoned cars and barking dogs," said Larry Benoit, superintendent and utility operator for Red Lake, Ear Falls, Machin and Madsen.

When forest fires threatened the northwestern community of Red Lake, Benoit, plant operator Peter Edmunds and two other Environment Ontario staff stayed in the evacuated town to keep the water tower full.

Without them, the town had no water. Without water, it had no defence against the flames.

Within two days of the first evacuation orders, Larry Benoit and his men were forced to follow the 4,000 evacuees before them.

Twenty-six miles of road between Ear Falls and Red Lake had been burned. For the next five days the town was powerless and at the mercy of the fire. Hydro and telephone poles were destroyed and outside communication almost impossible. The ravaging red flames could be seen for miles, constantly reminding the men that with a shift of wind the town could be destroyed.

When the fire held its distance, Benoit and Edmunds returned to refill the water tower. Once the supply was replenished and the situation less critical, Benoit returned to his own plant in Ear Falls.

Peter Edmunds stayed and continued his job alone until help came from the Thunder Bay regional office.

The recruits, Jim Stasiuk, manager of municipal and private abatement, and John Carbis, chief operator, left Thunder Bay May 24. Unsure of what lay ahead of them or when they could return, they took only the essentials: a radio, sleeping bags, a change of clothes and donuts. "We didn't know when we would have a chance to eat again," said Stasiuk.

They arrived in Balmertown, a few miles east of Red Lake, and found the airport abandoned. With telephone lines out, "there was no way to contact our plant operator, Peter Edmunds, for an update on the situation. We hitched a ride with a truck and hoped for the best," Stasiuk said.

Their trip to Red Lake unveiled a grim sight. Fire crews worked desperately along the roadsides, the forests smouldered, and thick black smoke blanketed the area for miles. Danger still remained.

Once in Red Lake, Stasiuk and Carbis helped Edmunds with the daily routines which could have saved the town if fire had moved closer. "You don't have time to think about danger," said Edmunds. "You just do your job. We worked most days from 6 a.m. to 10 p.m., and sometimes right through the night."



"The ravaging red flames could be seen for miles, constantly reminding the men that with a shift of wind their town could be destroyed."

(photo: MNR)

Without power, the men kept the pumping station and sewage treatment plant running with diesel engines. They made continuous checks of Red Lake, Madsen and Balmertown water supplies and searched the areas for running taps. "There was a constant drain on the water supply because many residents had left taps running to keep pipes from freezing. Others had put sprinklers on roofs to save their homes if flames reached town. Even with the residents gone, the town still used one-

quarter million gallons of water a day.

When the men found time to rest, they met at Forestry Point, the fire centre of the Ministry of Natural Resources. The centre provided a place for emergency crews to eat and sleep while the forest continued to burn.

Food was abundant at the centre during the first few days after the power went out. Butchers and store owners opened their freezers to the people who remained behind. "We had some great barbecues,"

Stasiuk said. "When we ate together, it was just like camp. No one spoke of the fires or the danger we faced."

During the days that fire menaced the town, Peter Edmunds recalls only one time he was "truly afraid."

"Saturday morning I woke up coughing and was scared. The smoke was so thick I could hardly breathe. I left immediately for Forestry Point where the air was clearer."

Rain finally fell, saving the town

and helping fire fighters control the blaze.

Today Red Lake evacuees are home and their town is slowly returning to normal. Residents still talk about the fires and their experiences and will for years to come.

They are thankful to the people who stayed behind to save their homes — the fire fighters, the police, Natural Resources and the men who kept the water running, the men from Environment Ontario.